

Sasol Solar Challenge: Driving innovation and shaping the future

More than a decade after its debut in South Africa, the Sasol Solar Challenge for young engineers continues to be a test of PV technology and electric vehicle innovation.

The Sasol Solar Challenge (SSC), in its fourteenth year, is a biennial competition for talented engineering teams from around the world to challenge each other to cover as much distance as possible on a route from Gauteng to the Western Cape. Local and international teams conceptualise, design and build solar-powered vehicles capable of driving against each other across South Africa in an eight-day event, showcasing their design, manufacturing and strategy skills.

Inspired by the World Solar Challenge, now the Bridgestone World Solar Challenge, which has been held in Australia since 1987, the challenge runs on South Africa's public roads, sharing space with trucks and regular traffic, and passes through multiple small towns.

Roughly 40 different solar car teams have competed since 2008, including new and experienced local and international teams from universities, high schools and private engineering groups.

Says Robert Walker, owner and director of the Sasol Solar Challenge: the SSC attracts international teams and world champions to come to South Africa and compete alongside our local teams. We can proudly say that this is the biggest in Africa.

The event is not just about having solar cars compete against each other, but also aims to raise awareness of the use of renewable energy, to attract young people into science, technology, engineering and mathematics, and to inspire them and the communities along the route to develop sustainable solutions to address mobility challenges within their neighbourhoods.

Solar car teams who have competed hail the event as the most well-organised with a challenging but adventurous format, which makes it even more attractive to international teams.

The format of the event, says Sanne Vilters, team leader for the Brunel Solar Team from Delft University of The Netherlands, together with the diverse weather conditions of South Africa and the changing road surfaces, offers a new and exciting challenge for international teams. Additionally, the SSC draws strong competition, which makes it even more attractive.

It also offers an educational experience,



Naledi 2, the solar car from NWU weighs only 170 kg and features a unique rotating solar array.

most notably in the STEM subjects (science, technology, engineering and mathematics) with teams learning from each other in terms of various technologies and solutions to global challenges, on a cultural level as well as team and functional level, says Johannes de Vries, Manager of the Tshwane University of Technology Solar Car Team. Participation in the Challenge, he says, is where STEM projects and team members undergo the ultimate test.

Francois Stevens, driver for the North West University Solar Car Team adds: The Sasol Solar Challenge is a multi-disciplinary initiative that presents a great opportunity for various education and private engineering institutions to work together on projects that contribute to sustainable mobility across the globe.

While building NWU solar cars, the team has been able to learn and develop new skills and techniques. NWU now has four solar cars and the student engineers continue to enhance their skills while competing in each challenge.

Opportunities for young people

The SSC provides young people with the opportunity to experience hands-on learning and witness real-life applications of STEM education from like-minded scholars from around the world. It also helps them to better understand how solar technology works and why electric transportation is important for the future. The solar vehicles – from

their aerodynamic design and the telemetry used to plan the route, to the energy-converting technology – are impressive visual representations of STEM subjects in action.

The Central University of Technology (CUT), a local team that competed for the first time in 2018, demonstrated technologies to school learners along the route by loading a 360° footage shot from their solar car onto virtual reality headsets, which could be used by young people along the route to immerse themselves in the driving experience.

Not only does it help young people to comprehend the concepts of STEM education and their applications, but it also assists them to develop a variety of skill sets, including creativity. And it challenges them to come up with their own innovative solutions that tackle real-life problems, says Nozipho Mbatha, Senior Manager: Group Brand and Sponsorships at Sasol.

A schools programme runs alongside the event, encouraging learners along the route to get involved in STEM. This year a project has been launched to challenge learners to develop a sustainable solution to address mobility challenges faced by their communities. Some of the projects will be showcased during the event's 'School Activations', which is a CSI initiative aimed at creating awareness, excitement and unique opportunities for school learners, with a specific focus on STEM subjects.

The Sasol Solar Challenge strives to be

the ultimate test of technology and innovation. Teams who compete have to practically apply the science and technology theory they've learnt at school or university and test their engineering skills against some of the best solar car teams in the world. They also contribute to industry research on solar technology, including the manufacturing of solar cells and electronics; battery systems that offer high density energy; and solar cells that are more efficient.

Their work can be applied to future electric vehicles to provide more efficient and cleaner alternative energy and cars themselves continue to highlight and promote renewable and sustainable energy and a greater interest in engineering.

Top teams and highlights

The current world solar challenge champions, Agoria Solar Team, won the 2019 Bridgestone World Solar Challenge in Australia. The team, from the University of Leuven in Belgium, now owns nine solar cars and has built a new car every two years since 2003. On six of the eight days, Agoria completed over 500 km and covered a record 609.4 km on the seventh day.

Seven-time global champions, Brunel/Delft University Solar Team, previously known as Nuon and Vattenfall, are former champions of the 2014, 2016 and 2018 Sasol Solar Challenges. The Delft University team started competing in solar challenges in 2001 and has since built 11 solar cars and competed in 14 solar challenges globally.

The Brunel team were neck and neck with Agoria throughout the race and were only 10 km behind at the start of the final day. The team won the final stage by just 28 km to end the race as winners, having completed 4228.2 km at an average speed of 67.7 kph, just 38.3 km ahead and 0.7 kph faster than Agoria.

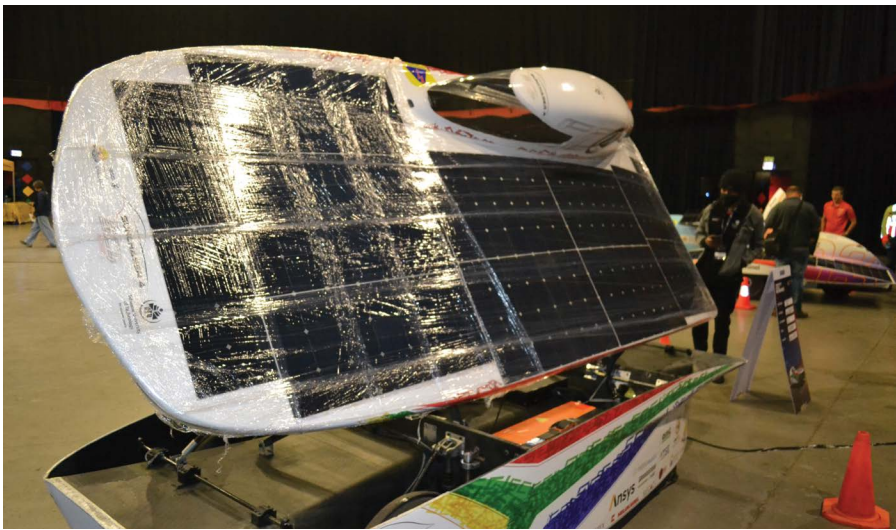
The international teams are believed to have invested some €5-million in the cars they brought to South Africa.

Tshwane University of Technology (TUT) SunChaser IV proved to be the closest South African competitor to the international teams, often completing over 400 km per day. The team's development focus for SunChaser IV was on aerodynamic drag reduction and active battery management, as well as logistics for future international participation. TUT finished third having completed 2 682.4 km at an average speed of 41.5 kph.

North West University (NWU) Solar Team's car is Naledi 2.0 and the team is the only other South African one that has competed the Bridgestone World Solar Challenge. NWU has been competing in the Sasol Solar challenge since 2012 and



The winning car from Brunel/Delft University Solar Team, the rebuilt Nuna11S, which is a three-wheeler that weighs just 157 kg.



TUT's SunChaser IV's development focus was on aerodynamic drag reduction and active battery management. The team finished third having completed 2 682.4 km at an average speed of 41.5 kph.

in 2016, they set a record with the furthest distance in a day at 611.9 km while completing 3 524 km during that challenge. This year's car had a unique rotating solar array and weighs only 170 kg. The car consistently covered 370 km per day when no reliability problems arose. The car completed 2 430.2 km of the race at an average speed of

37.5 kph. Also posting results at the finishing line were the Genuine JV Solar, SolarFlair and the University of the Free State (UFS) Teams, which all experienced reliability challenges; not at all surprising given the investment chasm between the top and bottom teams. Well done to them on getting to Cape Town.

www.solarchallenge.org.za

Team	Total km	Average kph	Max km per stage
Delft/Brunel	4 228.2	67.7	590.5
Agoria	4 189.9	67	609.4
TUT	2 682.4	41.5	422.2
NWU	2 430.2	37.5	384
JV Solar	1 281.8	19.6	221
SolarFlair	608.5	9.3	94.4
UFS	521.2	8.2	98.2